

Nucleotide sequence of a mouse cDNA encoding the non-histone chromosomal high mobility group protein-2 (HMG-2)

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Submitted August 20, 1992

Recently similarities between particular transcription factors and the nonhistone chromatin proteins HMG1/2 (1) has been reported. Among these factors are the human upstream binding factor hUBF (2), the mammalian testes-determining factor SRY (3), the lymphoid enhancer-binding factor LEF-1 (4), and the T cell-specific factor TCF-1 (5). The regions of homology between these transcription factors and HMG-1/2 proteins are designated HMG-boxes, and it is thought that they represent DNA binding domains (2). There are also evidences that HMG-1/2 may play a role in DNA replication (6), chromatin assembly (7) and as general transcription factors for RNA polymerase II (8).

We have cloned a cDNA from mouse cells which apparently encodes the murine HMG-2 gene. A protein with an apparent molecular weight of 30 kD was purified to homogeneity by conventional and DNA affinity chromatography. For DNA affinity chromatography a double stranded oligonucleotide derived from the nontranscribed spacer of the murine rDNA repeat was used. V-8 protease digestion and subsequent peptide sequencing of two peptides with a length of 15 and 13 amino acid residues, respectively, revealed 100% homology to HMG-2 proteins of pig and human. Two cDNA clones were isolated from a cDNA library derived from mouse PCC4 teratocarcinoma cells (Stratagene Corp., La Jolla, CA). Clones were identified by hybridization with an oligonucleotide probe based on the protein sequence. Sequence analysis of one insert revealed a cDNA of 847 bp in length containing a 135 bp 5' untranslated region, an open reading frame of 618 bp, and a 94 bp 3' untranslated region. The translated protein sequence shows a high degree of similarity to published porcine (9), human (10) and chicken (11) HMG-2 proteins (Figure 1) and to a lesser extend similarities to HMG-1 proteins from mouse (12) and other species (Table 1). Thus it seems highly probable that this clone represents the murine HMG-2 gene.

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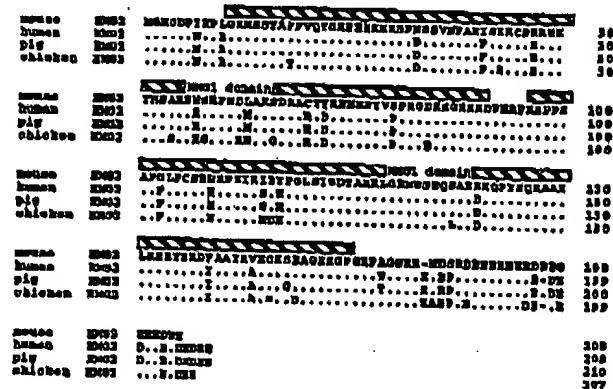


Figure 1. Sequence similarities between mouse, human, porcine and chicken HMG2 proteins. Non identical residues and the location of the HMG boxes are indicated.

Table 1. Nucleotide and amino acid sequence comparison between the mouse HMG2 sequence and HMG2 and HMG1 genes and proteins from other species

Species	Gene/Protein	Identity of nucleotides coding region	amino acid identity	amino acid similarity
mouse	HMG2	100%	100%	100%
human	HMG2	87%	85%	93%
pig	HMG2	87%	86%	93%
chicken	HMG2	81%	82%	92%
mouse	HMG1	73%	74%	84%
rat	HMG1	72%	73%	83%
human	HMG1	74%	74%	84%
pig	HMG1	74%	74%	84%
bovine	HMG1	75%	74%	84%